

## CLAIMS

1. An electrolyte composition comprising an ionic liquid and conductive particles as main components.

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2. The electrolyte composition according to claim 1 made into a gel.

3. The electrolyte composition according to claim 1, wherein a content of the conductive particles is not less than 0.05% by weight and not more than 10% by weight with respect to a total amount of the electrolyte composition.

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4. The electrolyte composition according to claim 1, wherein a content of the conductive particles is not less than 0.05% by weight and not more than 10% by weight with respect to the ionic liquid.

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5. The electrolyte composition according to claim 1, wherein the conductive particles are made of a material containing carbon as a main component.

6. The electrolyte composition according to claim 5, wherein the material containing carbon as a main component is one member or a mixture of a plurality of members selected from the group consisting of carbon nanotubes, carbon fibers, and carbon black.

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7. The electrolyte composition according to claim 6, wherein the carbon nanotubes are either one of or mixture of a single-wall carbon nanotubes and multi-wall carbon

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nanotubes.

8. A photoelectric conversion element comprising the electrolyte composition according to claim 1 contained as an electrolyte.

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9. A photoelectric conversion element, comprising:  
a working electrode, the working electrode comprising an electrode substrate and an oxide semiconductor porous film formed on the electrode substrate and sensitized with a dye;

10 a counter electrode disposed opposing the working electrode; and  
an electrolyte layer made of the electrolyte composition according to claim 1 provided between the working electrode and the counter electrode.

10. A dye-sensitized photovoltaic cell, comprising:

15 a working electrode, the working electrode comprising an electrode substrate and an oxide semiconductor porous film formed on the electrode substrate and sensitized with a dye;

a counter electrode disposed opposing the working electrode; and  
an electrolyte layer made of the electrolyte composition according to claim 1  
20 provided between the working electrode and the counter electrode.

11. An electrolyte composition comprising an ionic liquid and oxide semiconductor particles.

25 12. The electrolyte composition according to claim 11, further comprising conductive

particles.

13. The electrolyte composition according to claim 11 made into a gel.

5 14. The electrolyte composition according to claim 11, wherein the oxide semiconductor particles are one member or a mixture of two or more members selected from the group consisting of  $\text{TiO}_2$ ,  $\text{SnO}_2$ ,  $\text{WO}_3$ ,  $\text{ZnO}$ ,  $\text{ITO}$ ,  $\text{BaTiO}_3$ ,  $\text{Nb}_2\text{O}_5$ ,  $\text{In}_2\text{O}_3$ ,  $\text{ZrO}_2$ ,  $\text{Ta}_2\text{O}_5$ ,  $\text{La}_2\text{O}_3$ ,  $\text{SrTiO}_3$ ,  $\text{Y}_2\text{O}_3$ ,  $\text{Ho}_2\text{O}_3$ ,  $\text{Bi}_2\text{O}_3$ ,  $\text{CeO}_2$ , and  $\text{Al}_2\text{O}_3$ .

10 15. The electrolyte composition according to claim 14, wherein the  $\text{TiO}_2$  is either one of or a mixture of titanium oxide nanotubes and titanium oxide nanoparticles.

16. The electrolyte composition according to claim 12, wherein the conductive particles are made of a material containing carbon as a main component.

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17. The electrolyte composition according to claim 16, wherein the material containing carbon as a main component is one member or a mixture of two or more members selected from the group consisting of carbon nanotubes, carbon fibers, and carbon black.

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18. The electrolyte composition according to claim 17, wherein the carbon nanotubes are either one of or mixture of a single-wall carbon nanotubes and multi-wall carbon nanotubes.

25 19. The electrolyte composition according to claim 11, wherein a compounding

amount of the oxide semiconductor particles is not less than 0.05% by weight and not more than 70% by weight with respect to a total amount of the electrolyte composition.

20. The electrolyte composition according to claim 12, wherein a total compounding  
5 amount of the oxide semiconductor particles and the conductive particles is not less than 0.05% by weight and not more than 70% by weight with respect to a total amount of the electrolyte composition.

21. The electrolyte composition according to claim 11, wherein a compounding  
10 amount of the oxide semiconductor particles is not less than 0.05% by weight and not more than 70% by weight with respect to the ionic liquid.

22. The electrolyte composition according to claim 12, wherein a total compounding  
15 amount of the oxide semiconductor particles and the conductive particles is not less than 0.05% by weight and not more than 70% by weight with respect to the ionic liquid.

23. A photoelectric conversion element comprising the electrolyte composition according to claim 11 contained as an electrolyte.

20 24. A photoelectric conversion element, comprising:  
a working electrode, the working electrode comprising an electrode substrate and an oxide semiconductor porous film formed on the electrode substrate and sensitized with a dye;

a counter electrode disposed opposing the working electrode; and

25 an electrolyte layer made of the electrolyte composition according to claim 11

provided between the working electrode and the counter electrode.

25. A dye-sensitized photovoltaic cell, comprising:

a working electrode, the working electrode comprising an electrode substrate and  
5 an oxide semiconductor porous film formed on the electrode substrate and sensitized with  
a dye;

a counter electrode disposed opposing the working electrode; and  
an electrolyte layer made of the electrolyte composition according to claim 11  
provided between the working electrode and the counter electrode.

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26. An electrolyte composition comprising an ionic liquid and insulating particles.

27. The electrolyte composition according to claim 26 made into a gel.

15 28. The electrolyte composition according to claim 26, wherein the insulating  
particles are one member or a mixture of two or more members selected from the group  
consisting of diamond and boron nitride.

29. The electrolyte composition according to claim 26, wherein a compounding  
20 amount of the insulating particles is no less than 0.05% by weight and no more than 70%  
by weight with respect to a total amount of the electrolyte composition.

30. A photoelectric conversion element comprising the electrolyte composition  
according to claim 26 as an electrolyte.

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31. A photoelectric conversion element, comprising:

a working electrode, the working electrode comprising an electrode substrate and an oxide semiconductor porous film formed on the electrode substrate and sensitized with a dye;

5 a counter electrode disposed opposing the working electrode; and

an electrolyte layer made of the electrolyte composition according to claim 26 provided between the working electrode and the counter electrode.

32. A dye-sensitized photovoltaic cell, comprising:

10 a working electrode, the working electrode comprising an electrode substrate and an oxide semiconductor porous film formed on the electrode substrate and sensitized with a dye;

a counter electrode disposed opposing the working electrode; and

15 an electrolyte layer made of the electrolyte composition according to claim 26 provided between the working electrode and the counter electrode.